

Morphometric evaluation of tectonic activity in the northern Ochigata fault zone in the Southern Noto Peninsula, north-central Japan

*Hiroyuki Yamaguchi¹, Akira Takeuchi²

1.Graduate School of Science and Engineering for Education, University of Toyama, 2.Graduate School of Science and Engineering for Research, University of Toyama

The Ochigata fault zone consists of a 44 km long active faults in a NE-SW direction, from the northern edge to the western part of the Hodatsu hill in the neck of Noto Peninsula, Ishikawa Prefecture. The fault zone is divided into five segments from north to south: the Sekidosan fault, the Furuko fault, the Nodera fault, the Tsuboyama-Hachino fault and the fault of near Uchitakamatsu. The Sekidosan, the northern Nodera and the Uchitakamatsu faults are reverse in slip sense dipping to the east. The southern Nodera and the Tsuboyama-Hachino fault are reverse faults dipping to the west. Their latest event and recurrence interval are revealed by trench investigations performed at the central Sekidosan fault, and pointed out that the uplifting was finished before the Middle Pleistocene based of the geologic structure. However, the pattern of tectonic activity through the fault zone is unclear.

This study examined tectonic deformation of the northern Ochigata fault zone using Mountain-front sinuosity (S_{mf}) and the ratio of valley floor width to valley height (V_f), which were morphometric indices for representing tectonic activity. S_{mf} is explained as the ratio of length of mountain front along the foot of mountain to the straight length of mountain front. The poorer development of sinuosity means the higher uplift rates, and is consistent with the lower value of S_{mf} . V_f is explained by the ratio of width of valley floor to relative elevation between ridge and valley floor. In an area with high uplift rates, topographic profile illustrates a V-shaped profile with the both lower values. This study calculated the value of V_f at a position of 200 m on the mountain side from mountain front. In our morphometric analysis, the 5m-DEM of the Geospatial Information Authority of Japan publication was utilized, and was combined with the slope map and the over ground openness map for interpreting geomorphology of the mountain front.

Separating the mountain front of Sekidosan fault into 22 sections and the northern Nodera fault into 3 sections, the values of S_{mf} within the Sekidosan fault ranged from 3 to 6 at the northern part, 2 to 3.5 at the central and 4 to 25 at the southern. The values of S_{mf} at the northern Nodera fault were 3.5 to 11. The values of V_f within the Sekidosan fault were 2 to 6 at the northern part, 0.5 to 3 at the central and 4 to 35 at the southern. The values of V_f at the northern Nodera fault ranged from 4 to 6. The both indices for the Sekidosan fault performed lower at the center part, and the values of the northern and southern parts of Sekidosan fault and those of the northern Nodera fault became higher. In other words, tectonic activity of the northern Ochigata fault zone is the highest at the central Sekidosan fault and the activity tend to decrease towards the both terminations of Sekidosan fault and the northern Nodera fault.

No case study on S_{mf} and V_f has ever been done in Japan. To examine the quantitative relationship between the two indices and uplift rates, it is important to accumulate the more geological and geomorphological data.

Keywords: morphometric analysis, tectonic activity, Ochigata fault zone